

Varicella (Chickenpox) Surveillance Protocol

Healthcare Provider Responsibilities:

1. Manage patients with varicella and their close contacts in accordance with physician's guidance available at:
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Chickenpox_Provider.pdf
2. Reporting varicella:
 - a. Weekly report the total number of cases of varicella to your local health department by phone or fax throughout the year. You may report the number of varicella cases along with your weekly influenza-like illness report.
 - b. Immediately report all outbreaks of varicella in any setting to your local health department by phone. You may also report to West Virginia Division of Infectious Disease Epidemiology (DIDE) at 800-423-1271 in WV or 304-558-5358.
 - c. Within one week, report death associated with varicella to your local health department or DIDE, by using West Virginia Electronic Disease Surveillance System (WVEDSS) form for Chickenpox (Varicella) death:
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/chickenpoxDeath.pdf.

Laboratory Responsibilities:

1. Varicella is reportable as an aggregate total in West Virginia. You may report a positive laboratory test result of varicella, including patient demographic information, to West Virginia Division of Infectious Disease Epidemiology (DIDE) by faxing a report to 304-558-8736.
2. The infection control practitioner or the healthcare provider who ordered the test should be notified of a positive result immediately.

Public Health Actions (Responsibilities):

1. Employees who will conduct interview or face-to-face contact with infectious persons should be immune to varicella. If there is no contraindication, susceptible people should be offered varicella vaccine following Advisory Committee of Immunization Practices (ACIP) recommendations.
2. Educate your healthcare providers to report outbreak(s) of varicella immediately and report aggregate total chickenpox cases weekly to their respective local health department.
3. Reporting:
 - a. Report weekly to DIDE the aggregate total of chickenpox & influenza-like-illness (ILI) by using "Influenza like Illness and Chickenpox Weekly Reporting Form"
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/flupox_reporting_form.pdf Send the report to DIDE every Monday by faxing it to 304-558-8736.

Division of Infectious Disease Epidemiology

350 Capitol Street, Room 125, Charleston, WV 25301-3715

Phone: 304-558-5358 – Fax: 304-558-8736 – www.dide.wv.gov

8.22.2011

Page 1

Varicella (Chickenpox) Surveillance Protocol

- b. Report death due to chicken pox (varicella) by using West Virginia Electronic Disease Surveillance System (WVEDSS) form for Chickenpox (Varicella) death: http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/chickenpoxDeath.pdf
- c. Immediately report varicella outbreaks in any setting to your regional epidemiologist and DIDE via phone: 800-423-1271 or 304-558-5358.
4. Educate the public, such as parents and guardians of infants, children, adolescents, adults, and pregnant women about the disease and the importance of varicella vaccine. Adults aged 60 and older should be offered the shingle vaccine according to the ACIP recommendations.
5. Educate healthcare providers to track immune status of staff in healthcare settings. Offer vaccine to non-immune staff that have no contraindications.
6. Varicella in vaccinated persons is usually mild or atypical and can pose challenges for clinical diagnosis. Laboratory confirmation is important as fewer cases are seen among highly vaccinated populations. To view a specimen collection and demonstration video, visit: <http://www.cdc.gov/vaccines/vpd-vac/varicella/surv-collect-virus-spec.htm#form>
7. **Steps for Outbreak management:**
 - a. Check to confirm that the reported cases meet the clinical criteria for Varicella and the outbreak case definition.
 - b. Immediately notify DIDE to assist you with outbreak investigation.
 - c. Initiate rapid case and contact identification to prevent the spread of disease, especially among susceptible persons at high risk for serious complications of varicella, such as immunocompromised persons and pregnant women. For identification of close contacts, see Table 1

Table 1. Types of Exposure to Varicella or Zoster

Type of Contact	Description
Household	Residing in the same household
Playmate	Face-to-face*indoor play (*the contact should be Nontransient, some experts suggest a contact of 5 Or more minutes as constituting significant exposure; Others define close contact as more than 1 hour)
Hospital Setting Varicella	In same 2 to 4 bedroom or adjacent beds in a large ward, face-to-face*(see above) contact with an infectious staff member or patient, or visit by a person deemed contagious
Zoster	Intimate contact (e.g., touching or hugging) with a person deemed contagious
Newborn Infant	Onset of Varicella in the mother 5 days or less before delivery or within 48 hours after delivery; VariZIG or IGIV is not indicated if the mother has zoster.

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8.22.2011

Page 2

Varicella (Chickenpox) Surveillance Protocol

- d. Rapidly triage (interview) all cases of chickenpox and complete the chickenpox outbreak line listing form:
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Varicella_Outbreak_Line_List.pdf Determine vaccination status by contacting the parent for vaccination records. If the parent does not have this information, request that they obtain the information from their healthcare provider.
- e. Issue a healthcare provider alert and parent/guardian notification letter in settings where exposed persons may seek post exposure prophylaxis with vaccine, immune globulin, or antiviral therapy from their providers in the community. Sample healthcare provider and parent/guardian letters are available at
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Pages/Varicella.aspx
- f. Isolate (exclude) or cohort individuals with varicella until all of their lesions have formed scabs or crusts (usually 5 days after rash onset).
- g. Post exposure Immunization: Administration of varicella vaccine to individuals without evidence of immunity (see Table 2) exposed to varicella (12 months of age or older, including adults) may prevent or modify the disease, if administered as soon as possible, preferably within 72 hours (3 days) but up to 120 hours (5 days) after exposure, if there is no contraindication to vaccine use. During a varicella outbreak, give a second dose of varicella vaccine to those who have received one dose, provided the appropriate vaccination interval has elapsed since the first dose (3 months for people 12 months to 12 years of age and at least 4 weeks for people ≥ 13 years of age). West Virginia Division of Immunization Services may provide varicella containing vaccines for outbreak control when resources are available. Please contact DIDE immediately after verifying the outbreak to initiate control measures.

Table 2. Criteria for Evidence of Immunity

The Advisory Committee on Immunization Practices (ACIP) Criteria for Evidence of Immunity to Varicella:

1. Documentation of age-appropriate vaccination (See current recommendations)
 - a. Preschool-aged children 12 months of age or older: one dose
 - b. School-aged children, adolescents, and adults: two doses
2. Laboratory evidence of immunity or laboratory confirmation of prior disease.
3. Born in the US before 1980, except health-care workers, pregnant women, and immunocompromised individuals. These individuals need to meet one of the other criteria.
4. A healthcare provider diagnosis of chickenpox or history of chickenpox.
5. History of herpes zoster based on healthcare provider diagnosis.

For people reporting a history of or presenting with a typical and/or mild case, assessment by a physician or their designee is recommended and one of the following should be sought:

- a. An epidemiologic link to a typical varicella case or
- b. Evidence of laboratory confirmation.

When such documentation is lacking, people should not be considered as having a valid history of disease because other diseases may mimic mild atypical varicella.

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8.22.2011

Page 3

Varicella (Chickenpox) Surveillance Protocol

- h. Recommend varicella vaccination to non-immune childcare or school contacts even if the time since exposure is greater than 5 days, to protect from future exposure, especially if there is ongoing transmission in that setting.

Note: Varicella vaccine should not be administered to people who are immunocompromised or had an anaphylactic-type reaction to any component of the vaccine, including gelatin and neomycin.

- i. For individuals for whom varicella vaccine is contraindicated and no history of Varicella is unknown or those who have negative serologic test results, offer Immune Globulin Intravenous (IGIV) as soon as possible within 96 hours of varicella exposure. For detailed information about IGIV refer to WVDHHR "Provider Information Sheet":

http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Chickenpox_Provider.pdf WVDHHR does not provide IGIV.

- j. Chemoprophylaxis: If IGIV is not available or more than 96 hours have passed since exposure, some experts recommend prophylaxis with acyclovir for a susceptible immunocompromised patient who has been exposed to varicella. For detailed information, see

http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Chickenpox_Provider.pdf WVDHHR does not provide acyclovir.

- k. Exclude exposed susceptible individuals who may be in contact with persons at high risk of serious complications (e.g., health-care workers, family members of immunocompromised persons) for the duration of the period of communicability (i.e., 8 to 21 days after exposure).
- l. Assess the status of the outbreak control within the outbreak setting. Document the outbreak line listing form and fax the completed line listing form to DIDE at 304-558-8736.
- m. Healthcare personnel have increased potential for close contact with persons at high risk for developing severe disease and serious complications. In institutional outbreaks or outbreaks involving adolescents and adults, consider vaccinating susceptible persons (staff and residents) to limit or control the outbreak by interrupting transmission.
- n. Only persons with a history of chickenpox or varicella vaccination should come in contact with the varicella case until lesions have formed scabs or crusts.
- o. For hospital exposure, refer to
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Chickenpox_Provider.pdf

Varicella (Chickenpox) Surveillance Protocol

- p. In outbreaks where there are childcare or school requirements, unvaccinated children with no history of varicella should be vaccinated immediately or excluded from school up to 21 days after identification of the last case.
- q. It is unknown whether Reye syndrome results from administration of salicylates after immunization for varicella in children. Because of the association between Reye syndrome, natural varicella infection, and salicylates, the vaccine manufacturer recommends that salicylates be avoided for 6 weeks after administration of varicella vaccine.

Disease Prevention Objective

Prevent cases of disease by:

1. Full immunization of all children (12 months and older) and adults without evidence of immunity following the ACIP approved schedule.
2. Provide immunization for susceptible health care workers and high risk individuals.

Disease Control Objectives

After a case of chickenpox is identified in a setting, reduce further transmission by educating providers to:

1. Isolate (exclude) or cohort individuals with varicella until all of their lesions have crusted.
2. Offer chickenpox vaccine to susceptible individuals, preferably within 72 hours (3 days) but up to 120 hours (5 days) following varicella exposure. Encourage vaccination even if time since exposure is > 5 days to prevent future disease.
3. Offer IGIV or Acyclovir (if applicable) as soon as possible, but within 96 hours to susceptible persons who are at high risk for developing severe disease and when varicella vaccine is contraindicated.
4. Exclude exposed susceptible healthcare workers and isolate hospitalized patients who cannot be discharged from the 8th until the 21st day post exposure. (Red Book, 28th edition; p 719)

Disease Surveillance Objectives

1. To develop or improve outbreak detection and investigation, and monitor trends in varicella disease burden.
2. To monitor the impact of the varicella immunization program.

Public Health Significance

Varicella (chickenpox) is a febrile rash illness resulting from primary infection with the varicella-zoster virus (VZV). Varicella is highly infectious with secondary infection rates between 65% and 85% among susceptible household contacts. While mostly mild disorder in childhood, varicella tends to be more severe in adults. It may be

Varicella (Chickenpox) Surveillance Protocol

fatal, especially in neonates and in immunocompromised persons. VZV causes a systemic infection that usually results in lifetime immunity. According to CDC, approximately 11,000 hospitalizations and 100 deaths occurred before the introduction of live attenuated varicella vaccine in 1995. Varicella affected mainly children with approximately 90% of cases occurring before the age of 15 years. In the 1970s and 1980s, the highest rates of disease were among children 5-9 years of age followed closely by children 1-4 years of age. In the 1990s, the highest rate of disease has been reported in the preschool age group. This may be due to increasing attendance at childcare and preschool. Children with varicella expose adults in households, schools, and daycare centers to the risk of severe, even fatal disease. Maximum transmission occurs during late winter and spring.

In 2007, 90% of 19-35 month-old children in United States had received one dose of varicella vaccine. As vaccine coverage increases and the incidence of wild-type varicella decreases, a greater number of varicella cases are occurring in immunized people as breakthrough disease. In the surveillance areas with high vaccine coverage, the rate of Varicella disease decreased by approximately 85% from 1995 to 2004. Immunocompromised people with primary (varicella) or recurrent (zoster) infection are at increased risk of severe disease.

Clinical Description

Varicella (Chickenpox) is a febrile rash illness resulting from primary infection with the varicella-zoster virus (VZV). Varicella in children is usually a self-limited disease that lasts 4-5 days and is characterized by fever, malaise, and a generalized vesicular rash typically consisting of 250-500 blister-like lesions, usually on the face, scalp or trunk. Adolescents, adults, and immunocompromised persons usually have more severe disease and are at higher risk for complications. Serious complications include secondary bacterial infections (most notably those caused by group A beta-hemolytic streptococcus, including cellulites, necrotizing fasciitis, septicemia, and toxic shock syndrome), pneumonia, encephalitis, cerebellar ataxia, Reye syndrome, and death. The consequences of primary VZV infection in pregnancy for the mother and for the fetus vary with the gestational period. Although primary infection (Varicella) in pregnant women is rare since most women of childbearing age are immune to VZV, varicella in pregnancy is also associated with a risk for VZV transmission to the fetus or weight, cutaneous scarring, limb hypoplasia, microcephaly, cortical atrophy, chorioretinitis, cataracts, and other anomalies.

Etiologic Agent

Varicella-zoster virus (VZV) is a member of the herpes virus family.

Reservoir

Humans are the only source of infection for this virus.

Varicella (Chickenpox) Surveillance Protocol

Mode of Transmission

Transmission occurs from person to person by direct contact with patients with either varicella or herpes zoster lesions, by airborne droplets, infected respiratory secretions, or from contact with vesicular zoster lesions.

Incubation Period

The incubation period for varicella is 10-21 days, most commonly 14-16 days.

Infectious Period

The infectious period for varicella is usually 1-2 days before onset of rash, and continuing until all lesions are crusted which is usually 4-5 days after onset of rash. Contagiousness may be prolonged in patients with altered immunity.

Outbreak Recognition (Definition)

To facilitate disease prevention and control, health departments should encourage varicella outbreak reporting in the following situations: five or more cases from any given school, day care facility, or long term care facility that are epidemiologically linked.

Case Definitions

Clinical description

- An illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause.

Laboratory criteria for diagnosis

- Isolation of varicella virus from a clinical specimen, or
- Varicella antigen detected by direct fluorescent antibody test, or
- Varicella-specific nucleic acid detected by polymerase chain reaction (PCR), or
- Significant rise in serum anti-varicella immunoglobulin G (IgG) antibody level by any standard serologic assay.

Case Classification

Probable:

An acute illness with

- Diffuse (generalized) maculopapulovesicular rash, AND
- Lack of laboratory confirmation, AND
- Lack of epidemiologic linkage to another probable or confirmed case.

Varicella (Chickenpox) Surveillance Protocol

Confirmed:

An acute illness with diffuse (generalized) maculopapulovesicular rash, AND

- Epidemiologic linkage to another probable or confirmed case, OR
- Laboratory confirmation by any of the following:
 - ❖ Isolation of varicella virus from a clinical specimen, OR
 - ❖ Varicella antigen detected by direct fluorescent antibody test, OR
 - ❖ Varicella-specific nucleic acid detected by polymerase chain reaction (PCR) OR
 - ❖ Significant rise in serum anti-varicella immunoglobulin (IgG) antibody level by any standard serologic assay.

Notes:

Two probable cases that are epidemiologically linked are considered confirmed, even in the absence of laboratory confirmation.

In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is almost always mild with fewer than 50 skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles).

Laboratory confirmation of cases of varicella is not routinely recommended; laboratory confirmation is recommended for fatal cases and in other special circumstances.

Varicella deaths case definition and case classification

Case classification:

Probable: A probable case of varicella that contributes directly or indirectly to acute medical complications that result in death.

Confirmed: A confirmed case of varicella that contributes directly or indirectly to acute medical complications that result in death.

Laboratory Diagnosis of Varicella

Laboratory testing for varicella is not routinely required but is indicated to confirm the diagnosis in severe or unusual cases or to determine varicella susceptibility.

Preventive Interventions

- The advisory Committee on Immunization Practices recommends varicella vaccination for persons not previously immunized, persons without previous history of infection, or persons at high risk for exposure.
- Administration of varicella IGIV for high risk groups for whom varicella vaccine is contraindicated.

Varicella (Chickenpox) Surveillance Protocol

- The American Academy of Pediatrics (AAP) recommends excluding affected children from school until the lesions have crusted. This may not prevent spread of varicella because the child is infective before rash appears.

Surveillance Indicators

- Proportion of MMWR weeks for which reporting of chickenpox is available (county level).

References:

Manual for the Surveillance of Vaccine-Preventable Diseases, 5th edition, 2011, CDC
<http://www.cdc.gov/vaccines/pubs/surv-manual/index.html>

Strategies for the Control and investigation of Varicella Outbreaks 2008, National Center for Immunization and Respiratory Diseases, CDC

Varicella-Zoster Infections, page 714-727, Red Book (28th edition)-2009 Reports of the Committee on Infectious Diseases, American Academy of Pediatrics.

CDC Varicella-Zoster Infection - <http://www.cdc.gov/shingles/index.html>